4.9 NOISE

4.9.1 EXISTING CONDITIONS

This section includes a summary of applicable regulations and a description of ambient noise conditions. It also includes an analysis of noise impacts associated with the implementation of the CIC in terms of (1) short-term construction noise; (2) long-term operational mobile source noise; (3) long-term operational stationary source noise; and (4) compatibility of proposed land uses with onsite noise levels. This section also recommends mitigation measures, as necessary, to reduce significant noise impacts. Where appropriate and relevant, this section identifies the differences in impacts that would be anticipated to occur under the single level and stacked design options. However, the number of inmates housed at SQSP would have no bearing on construction and operational noise levels at the site. Therefore, budgeted and maximum capacity conditions are not considered in this analysis.

ACOUSTIC FUNDAMENTALS

Noise is often defined as unwanted sound. Common environmental noise sources and noise levels are presented in Exhibit 4.9-1. Sound is a mechanical form of radiant energy transmitted by pressure waves in the air. It is characterized by two parameters: amplitude (loudness) and frequency (tone).

Amplitude

Amplitude is the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

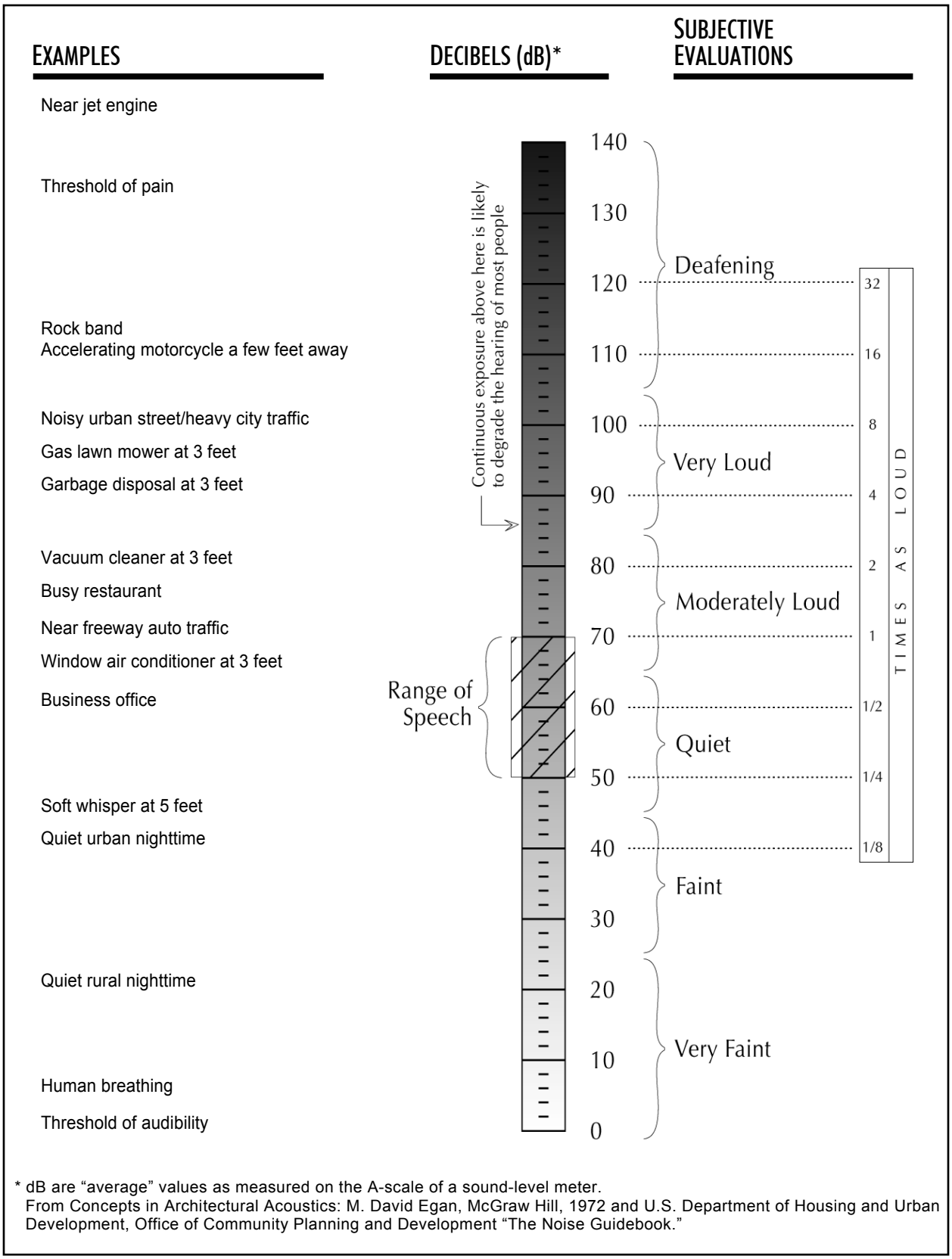
Frequency

Frequency is the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. Sound waves below 16 Hz or above 20,000 Hz cannot be heard at all, and the ear is more sensitive to sound in the higher portion of this range than in the lower. To approximate this sensitivity, environmental sound is usually measured in A-weighted decibels (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA.

Noise Descriptors

The intensity of environmental noise fluctuates over time, and several descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source is dependant upon the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often used to describe environmental noise are defined below.

- L_{max} (Maximum Noise Level): The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."



* dB are "average" values as measured on the A-scale of a sound-level meter.
From Concepts in Architectural Acoustics: M. David Egan, McGraw Hill, 1972 and U.S. Department of Housing and Urban Development, Office of Community Planning and Development "The Noise Guidebook."

Source: EDAW 2003

Typical Noise Levels

EXHIBIT 4.9-1

- L_{min} (Minimum Noise Level): The minimum instantaneous noise level during a specific period of time.

- L_{eq} (Equivalent Noise Level): The energy mean noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the L_{eq}.

- L_{dn} (Day-Night Noise Level): The 24-hour L_{eq} with a 10 dBA "penalty" for the noise-sensitive hours between 10:00 p.m. and 6:00 a.m. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.

- CNEL (Community Noise Equivalent Level): The CNEL is similar to the L_{dn} described above, but with an additional 4.77 dBA "penalty" for the noise-sensitive hours between 7:00 p.m. to 10:00 p.m., which are typically reserved for relaxation, conversation, reading, and television. If using the same 24-hour noise data, the CNEL is typically approximately 0.5 dBA higher than the L_{dn}.

Characteristics of Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources, such as automobiles, trucks and airplanes, and stationary sources, such as construction sites, machinery, and industrial operations. Noise generated by mobile sources (e.g., cars, trains) typically attenuates at a rate between 3.0 to 4.5 dBA per doubling of distance. The rate depends on the ground surface and the number or type of objects between the noise source and the receiver. Hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of 3.0 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance. Noise generated by stationary sources typically attenuate at a rate between 6.0 to about 7.5 dBA per doubling of distance.

Sound levels can be reduced by placing barriers between the noise source and the receiver. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver. Buildings, concrete walls, and berms can all act as effective noise barriers. Wooden fences or broad areas of dense foliage can also reduce noise, but are less effective than solid barriers.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks demanding concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

4.9.2 REGULATORY BACKGROUND

Existing Noise-Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings, including senior housing, are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are also considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places, where low interior noise levels are essential, are also considered noise-sensitive land uses.

Noise-sensitive land uses in the project vicinity include both onsite and offsite residential dwellings, the nearest of which include the 57 onsite prison employee residences located within the project site. Under the single level design option, these onsite employee residences may be removed as part of the project. The nearest offsite residential dwellings are located in San Quentin Village, approximately 2,700 feet from the project site. Residential dwellings are also planned for construction along Sir Francis Drake Boulevard approximately 1,700 feet west of the project site.

Existing Noise Environment

The existing noise environment within the project area is influenced primarily by surface transportation noise emanating from vehicular traffic on area roadways, primarily Interstate 580 (I-580). Additional transportation-related noise sources, including occasional aircraft overflights and pass-bys of watercraft within the San Francisco Bay, as well as occasional loudspeaker announcements at San Quentin Prison, also contribute to the existing background noise levels.

An ambient noise survey was conducted on July 15, 2004 to document the existing noise environment in the vicinity of the project site. Measurements were taken for a period of 15 minutes at each location during the non-peak traffic hours using a Larson Davis model 820 sound level meter placed at approximately 4.5 feet above the ground surface. Exhibit 4.9-2 depicts the locations at which ambient noise measurements were taken. The daytime A-weighted sound levels measured during each survey are summarized in Table 4.9-1. Based on the measurements conducted, average daytime noise levels (in dBA L_{eq}) in the project vicinity generally range from the upper 40s to the low 50s. Maximum noise levels ranged from the low to upper 60s.

Table 4.9-1
Ambient Noise Measurements

Location		Time	A-Weighted Sound Level (dBA)		
			L_{eq}	L_{min}	L_{max}
1	Employee Housing; Northeast of Project Site	9:30 – 9:45 a.m.	49.5	44.2	66.9
2	Employee House Northwest of Project Site	10:00 – 10:15 a.m.	47.7	42.3	60.0

Monitoring locations correspond to those depicted in Exhibit 4.9-2. Noise survey conducted on July 15, 2004. Measurements were taken using a Larson Davis model 820 sound level meter placed at approximately 4.5 feet above the ground surface.
Source: EDAW 2004

Source: Kitchell 2003; EDAW 2004

Noise Monitoring Locations

EXHIBIT 4.9-2

San Quentin State Prison Condemned Inmate Complex Project Draft EIR
P 3T053.01 07/04

0 177 354
FEET

NORTH

EDAW

EXISTING TRAFFIC NOISE

Existing traffic noise levels were calculated for roadway segments in the project vicinity using the Federal Highway Administration's Highway Noise Prediction Model, FHWA-RD-77-108 (FHWA 1978). Refer to Appendix E for traffic noise modeling results. Table 4.9-2 presents the CNEL/L_{dn} value at 50 feet from the centerline of the near travel lane for existing roadways near the project site. The roadway segments modeled were selected because they represent the locations where the greatest potential increase in project-generated traffic, and consequently potential project-generated noise, would occur. The roadway noise levels presented assume no natural or man-made shielding between the roadway and the noise receptor. As indicated in the table, existing average daily traffic noise levels along Sir Francis Drake Boulevard average approximately 72 dBA CNEL at 50 feet from the centerline of the near travel lane. Existing noise levels along Main Street are predicted to average approximately 58 dBA CNEL.

Table 4.9-2
Calculated Existing Roadway Traffic Noise

Roadway Segment	Traffic Noise Level (dBA CNEL/L_{dn}) at 50 Feet From Centerline of Near Travel Lane
Sir Francis Drake Boulevard	
West of San Quentin West Gate	71.7
East of San Quentin West Gate	71.7
Main Street, West of I-580	57.6

Calculated existing roadway traffic noise levels do not assume any natural or manmade shielding effects between sources and receptors.
Source: EDAW 2004

Noise Guidelines and Standards

Various private and public agencies have established noise guidelines and standards to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise. Applicable standards and guidelines are discussed below.

World Health Organization

Since 1980, the World Health Organization (WHO) has addressed the problem of community noise. In 1992, the WHO Regional Office for Europe convened a task force meeting which set up guidelines for community noise. A preliminary publication of the Karolinska Institute, Stockholm, on behalf of WHO, appeared in 1995. The WHO has since finalized these guidelines and in 2000 published the *Guidelines for Community Noise*. The WHO-recommended noise values identified in the *Guidelines for Community Noise* are based on levels of noise that would ensure the protection of health (critical health effect) and minimize levels of annoyance.

The maximum allowable exterior noise levels recommended by the WHO for residential uses are 55 dBA L_{eq} and 45 dBA L_{eq} for daytime and nighttime hours, respectively. To avoid sleep disturbance during the more noise-sensitive nighttime hours, the WHO-recommended maximum exterior noise level at the façade of residential dwellings is 60 dB L_{max} or 45 dBA L_{max} within interior sleeping areas (WHO 2000).

State of California

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, freeway noise affecting classrooms, sound transmission control, occupational noise control, and noise insulation.

The State has established noise compatibility standards for prisons within Title 15 of the California Code of Regulations. The section states "Housing areas shall be designed and constructed so that the average noise level does not exceed 70 decibels during periods of activity and 45 decibels during sleeping hours."

The California Sound Transmission Control Standards state that interior noise levels attributable to exterior sources, with windows closed, shall not exceed an annual noise level of 45 dBA L_{dn} in any habitable room. The State Office of Noise Control provides guidance for the acceptability of projects within specific L_{dn} contours (State Office of Noise Control 1976). Projects that include residential uses, churches, libraries and schools are normally unacceptable in areas in which noise levels exceed 70 dBA L_{dn}, and conditionally acceptable in areas with noise levels between 60 and 70 dBA L_{dn}.

Local Government Standards and Guidelines

Because a State agency (CDC) is the proponent for this project, compliance with local standards is not required. However, the State considers local noise standards as they relate to the compatibility between the state prison and various land uses adjacent to the project site. Local noise standards are used as guidelines for what the CDC considers as acceptable noise levels in noise-sensitive areas.

Marin County General Plan Noise Element

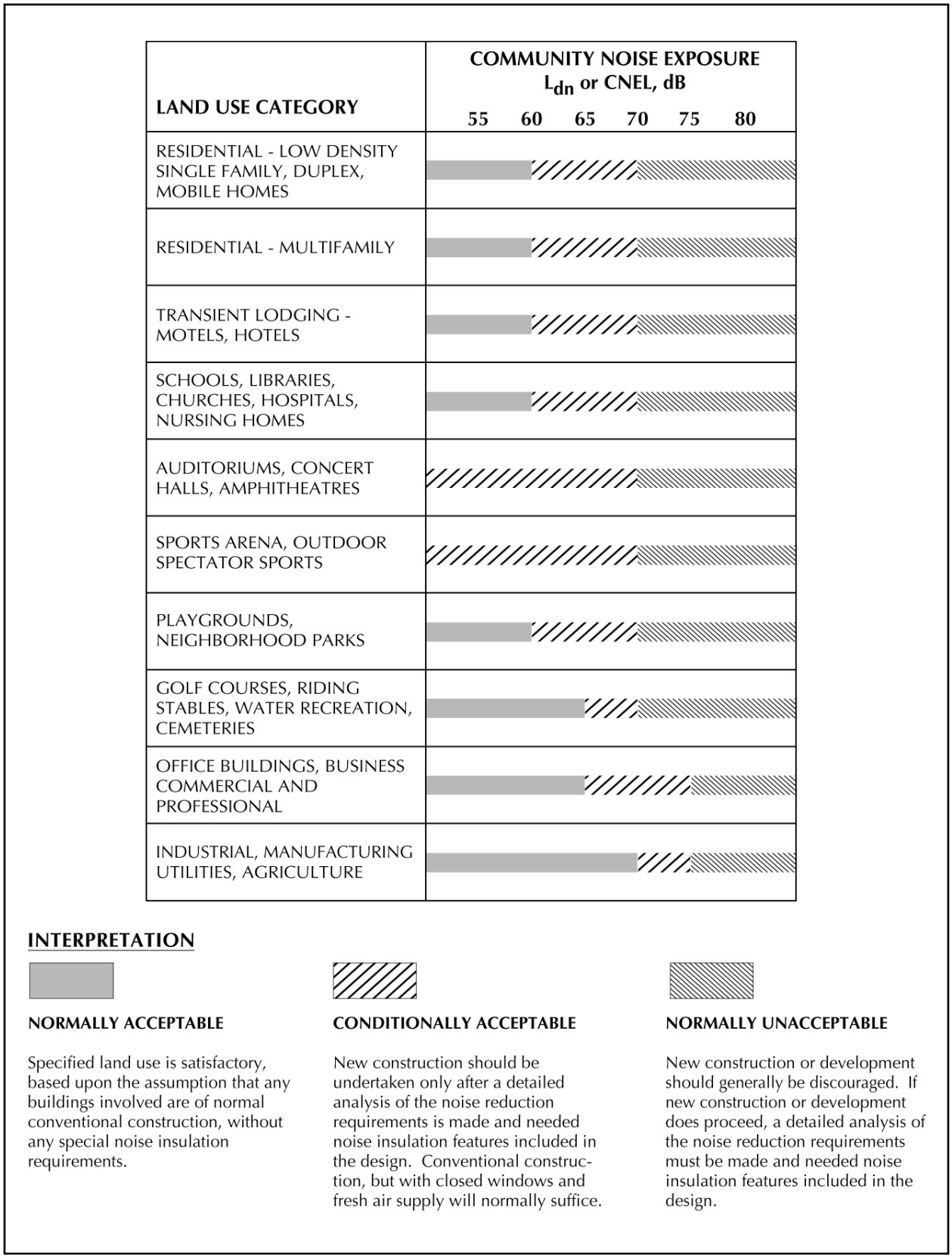
The Marin Countywide Plan Noise Element contains policies that address noise-sensitive land uses and standards to avoid noise-related impacts from existing uses and new developments within the unincorporated part of the County. Exhibit 4.9-3 presents the Marin County Land Use Compatibility for Community Noise Environments.

City of Larkspur General Plan Noise Element

The goal of the noise sub-element is to ensure that City residents are not subjected to noise beyond acceptable levels. One of the objectives of the noise sub-element is to protect existing noise-sensitive development from new uses that would generate noise levels incompatible with those uses and, conversely, discourage noise-sensitive uses from locating near sources of high noise levels. In its noise element, the City of Larkspur identifies maximum allowable noise exposure for land use compatibility (see Exhibit 4.9-3). As identified in Exhibit 4.9-3, residential land uses proposed for development within the City of Larkspur are considered "normally acceptable" at levels less than approximately 55 dBA L_{dn}/CNEL, "conditionally acceptable" between approximately 55 to 70 dBA, "potentially unacceptable" between approximately 70 and75 dBA, and "normally unacceptable" at levels exceeding 75 dBA.

City of Larkspur Noise Ordinance

For the protection of people from severe noise levels, the City of Larkspur has adopted a noise control ordinance. In accordance with the ordinance, it is generally considered unlawful for any person at any location within the City to create, or cause to be created, any noise that exceeds the exterior noise limits, summarized in Table 4.9-3.



Source: EDAW 2003

Marin County Land Use Compatibility for Community Noise Environments EXHIBIT 4.9-3

Table 4.9-3 City of Larkspur Exterior Noise Limits		
Receiving Land Use	**Time**	**Noise Level not to be Exceeded for More than 30 Minutes per Hour (dBA)**
Residential	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	40
Commercial	Any Time	60
Exterior noise limit shall be adjusted as follows: +20 dBA: Noise occurs less than one minute per hour +15 dBA: Noise occurs more than one, but less than five minutes per hour +10 dBA: Noise occurs more than five, but less than fifteen minutes per hour +5 dBA: Noise that occurs more than fifteen, but less than thirty minutes per hour -5 dBA: Steady, audible tone such as a whine, screech, or hum; repetitive or impulsive noise; speech or music. Source: City of Larkspur Municipal Code, Chapter 9.54, Noise Control Regulations		

Construction activities occurring between the hours of 7 a.m. and 6 p.m. Monday through Friday (excluding legal holidays) and between the hours of 9 a.m. and 5 p.m. on weekends and legal holidays are exempt from these requirements. In addition, grading, excavation, and fill activities occurring between the hours of 7 a.m. and 6 p.m. Monday through Friday (excluding legal holidays) are also considered exempt.

Community Ambient Noise Degradation

In addition to the criteria discussed above, another consideration in defining impact criteria is based on the degradation of the existing noise environment. In community noise assessments, it is "generally not significant" if no noise-sensitive sites are located in the project area, or if increases in community noise level with the implementation of the project are expected to be 5 dBA or less at noise-sensitive locations, and the proposed project would not result in violations of local ordinances or standards.

Blasting Noise Level Criteria

There are no blasting noise level criteria contained within the Marin County General Plan. However, criteria have been developed by the U.S. Bureau of Mines for safe blasting where an earth path exists to nearby structures. The criteria are based upon a linear peak noise level and the C-weighted maximum noise level. The peak linear noise level that is recommended by the U.S. Bureau of Mines is 129 dB, and a C-weighted maximum noise level of 105 dB (Bollard and Brennan 2003).

Construction Vibration Noise Level Criteria

Both Caltrans and the U.S. Bureau of Mines have established vibration criteria for both construction related equipment and for blasting. A ground vibration of 2.0 IPS (inches per second peak particle velocity, PPV) have been established for structures. Most blasting and equipment vibration levels are held to a limit of 1.0 IPS when possible (Bollard and Brennan 2003).

4.9.3 ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

THRESHOLDS OF SIGNIFICANCE

The proposed project would have a significant impact if predicted noise levels at nearby noise-sensitive land uses would result in:

- a substantial (i.e., 5 dBA, or greater) temporary or periodic increase in ambient noise levels; or
- a substantial (i.e., 5 dBA, or greater) permanent increase in ambient noise levels; or
- the exposure of persons to or generation of noise levels in excess of applicable standards or guidelines.
- Blasting noise exceed a peak linear noise level of 129 dB, or a C-weighted maximum noise level of 105 dB;
- Ground vibration noise levels exceed 1.0 IPS PPV;

SHORT-TERM PROJECT IMPACTS

Construction Noise Impacts

Construction activities associated with the project would temporarily increase the ambient noise level at and adjacent to the project site. Construction noise would primarily result from heavy equipment operations and truck traffic.

Construction equipment associated with projects such as this one typically generate noise levels ranging from approximately 75 to 96 dBA at 50 feet, depending upon the equipment being used. Maximum construction noise levels would most likely occur during pile-driving, which can generate levels ranging from 81 to 96 dBA. Blasting (of Dairy Hill) may also occur, and noise levels would be within this range. Although a detailed construction equipment list is not currently available, it is expected that the primary sources of noise would include tractors, backhoes, compressors, bulldozers and other related equipment. Table 4.9-4 depicts the noise levels generated by various types of construction equipment. Typical operating cycles may involve 2 minutes of full-power operation, followed by 3 or 4 minutes of operation at lower levels. In addition, construction activities are carried out in stages, with different equipment and noise characteristics depending upon the stage of construction and the location of the work within the construction site. During these stages, the character and magnitude of noise levels surrounding the construction site changes as work progresses. Despite the variety in type and size of construction equipment, similarities in the dominant noise sources and patterns of operation exist.

Noise from localized point sources (such as construction sites) typically decreases by about 6 dBA with each doubling of distance from source to receptor. Given this noise attenuation rate, outdoor receptors within approximately 3,000 feet of construction sites could experience maximum instantaneous noise levels of greater than 60 dBA L_{eq} when onsite construction-related noise levels exceed 96 dBA L_{eq} at the project site boundary. Assuming an average exterior-to-interior noise reduction of 15 dBA (with windows open) predicted interior noise levels at nearby onsite and offsite residences located within approximately 3,000 feet of the construction site could exceed 45 dBA for brief periods of time. Onsite residences, residences within San Quentin Village, and planned residences in Larkspur, 1,700 feet to the west, would be exposed to these noise levels.

Construction activities would result in a substantial (i.e., 5 dBA or greater) temporary increase in ambient noise levels at nearby noise-sensitive land uses. A total of 57 existing onsite employee residences would be demolished under the single level design option (they would not be sensitive receptors) and retained under the stacked option (they would be sensitive receptors). Under both design options, no construction would occur in the evening or nighttime hours unless under emergency conditions. Onsite residences, other staff residences on SQSP, and planned residences in Larkspur are within 3,000 feet of the site and would be exposed to construction noise, during the day including the larkspur residences if they are occupied before project construction. As a result, construction-generated noise would be considered a significant short-term impact (Impact 4.9-a).

Table 4.9-4
Noise Levels Generated by Typical Construction Equipment

Type of Equipment	Range of Sound Levels (dBA at 50 feet)	Suggested Sound Levels for Analysis
Pile Driver (12,000-18,000 ft-lb/blow)	81–96	93
Rock Drill	83–99	96
Jack Hammer	75–85	82
Pneumatic Tools	78–88	85
Pumps	68–80	77
Dozer	85–90	88
Tractor	77–82	80
Front-End Loader	86–90	88
Hydraulic Backhoe	81–90	86
Hydraulic Excavator	81–90	86
Grader	79–89	86
Air Compressor	76–86	86
Truck	81–87	86

Source: Bolt, Beranek and Newman 1971; FTA 1995

Blasting Noise

There may be a need for blasting of rock formations during the construction of the proposed facilities. Noise sources associated with blasting consist of rock drills and the shot itself. The noise levels generated by the rock drills are dependant on drill type, but are generally similar to the noise levels generated by excavation equipment, which are approximately 90 dBA at 50 feet (Bollard and Brennan 2003).

Noise generated by blasting shots are more variable, depending on the amount of charge-material used, the number of holes and the depth of those holes, timing delays, and other factors. There tends to be misconceptions regarding what a rock blast looks and sounds like. In reality, rock formation shots are designed to transfer the energy of the shot into the ground, rather than have it vent into the atmosphere sending rocks flying.

Observations by the EIR consultant of various aggregate mining operations shots in recent years confirm that the aggregate shots are characteristic of muted thunder claps, rather than fiery explosions. However, as described earlier, this is dependent upon the amount of charge-material used, the number of holes and the depth of those holes, timing delays, and other factors. Charges used for dislodging large rock formations at quarry operations are expected to be much larger than those required for this project (Bollard and Brennan 2003). However, due to the close proximity of the project site to the nearest

residences, noise levels could exceed the blasting maximum noise level criteria of 129 dB peak, and 105 dBC at distances of approximately 300 feet.

Although predicted blasting noise levels at onsite residential dwellings (stacked design option) are not anticipated to exceed the maximum noise level criteria of 129 dB peak, and 105 dBC, detectable increases in ambient noise levels could potentially occur, for brief periods of time. Blasting occring during the daytime hours may, therefore, result in increased levels of annoyance. This impact would be potentially significant under the stacked design option but, would be less than significant under the single level design option (Impact 4.9-b).

Construction Vibration Impacts

There are no FHWA or state standards for vibrations. The traditional view has been that highway traffic and construction vibrations pose no threat to buildings and structures, and that annoyance to people is no worse than other discomforts experienced from living near highways. However, as previously discussed, a considerable amount of research has, been done to correlate vibrations from single events such as dynamite blasts with architectural and structural damage. The U.S. Bureau of Mines has set a "safe blasting limit" of 2 inches per second (IPS). Below this level there is virtually no risk of building damage associated with most construction activities, including single-event vibration occurrences such as blasting (Caltrans 2002). Most blasting and equipment vibration levels are held to a limit of 1.0 IPS, when possible (Bollard and Brennan 2003).

Groundborne vibration levels associated with the project would be primarily associated with the operation of pile drivers, pavement breakers, and blasting activities. To a lesser extent, the operation of dozers and other heavy motorized equipment would also contribute to short-term groundborne vibration, primarily during initial ground clearing operations. According to Caltrans and measurements conducted at similar construction sites, the operation of heavy equipment (e.g., dozers, excavators, soil compactors) would not result in vibration levels that exceed the peak particle velocity criterion of 1 IPS.

Similar to noise generation from blasting, groundborne vibration generated by blasting shots are more variable, depending on the amount of charge-material used, the number of holes and the depth of those holes, timing delays, and other factors. Little information is available, however, pertaining to the damaging effects of pile driving. Although technically a series of single events, pile driver blows occurring often enough in a confined area could cause damage at a lower level than the single event criterion of 1 IPS (Caltrans 2002).

The way a building is constructed and the condition it is in determines how much vibration it can withstand before damage appears. According to Caltrans, the architectural damage criterion for continuous vibrations, 5 mm/s (0.2 IPS) appears to be conservative even for sustained pile driving. However, it should be noted that pile driving levels can often exceed 0.2 IPS at distances of 50 ft, and 0.5 IPS at 25 ft. For normal residential dwellings, however, pile driving peaks should probably not be allowed to exceed 0.3 IPS. In addition, extreme care must be taken when sustained pile driving occurs within 25 ft of any building, and within 50-100 ft of a historical building, or building in poor condition (Caltrans 2002.)

Because of the uncertainties in shot sizes, timing delays, and number of holes, blasting would be a potentially significant short-term impact to onsite houses (stacked design option). Likewise, given the close proximity of employee housing (if retained) to construction areas, ground-borne vibration levels associated with pile driving activities would also be a potentially significant short-term impact under the stacked, but not single level, design option. Existing onsite employee housing, which are the sensitive

receptors likely most affected by construction-generated groundborne vibration, would be demolished under the single level design option and retained under the stacked option. (Impact 4.9-c)

LONG-TERM PROJECT IMPACTS

Increases in Traffic Noise

Implementation of the project would result in a slight increase in traffic to existing roadways. To examine the traffic noise impacts, traffic noise levels associated with the project were calculated for roadway segments in the project study area using FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Projected traffic noise levels, with and without the project, for Sir Francis Drake Boulevard and Main Street are shown in Table 4.9-5.

Increases in vehicle traffic attributable to the project would result in a negligible and not perceptible increase (i.e., 0.1 dBA) in traffic noise. Increases in traffic noise would be less than significant (Impact 4.9-d).

Table 4.9-5
Predicted Traffic Noise Levels

Roadway Segment	dBA CNEL/L_{dn} at 50 Feet		Increase Over Existing Levels	Significant Impact?
	Existing	Existing With Project		
Sir Francis Drake Boulevard				
West of San Quentin West Gate	71.7	71.7	0.0	No
East of San Quentin West Gate	71.7	71.8	0.1	No
Main Street, West of I-580	57.6	57.7	0.1	No

Traffic noise levels calculated at 50 feet from centerline of near travel lane; does not assume shielding.
Source: EDAW 2004

Increases in Stationary Source Noise

The project would include the installation of additional public address (PA) systems, to be located at various locations in the vicinity of the proposed inmate housing units. The exact number of PA systems has not yet been determined. Based on noise measurements conducted at similar facilities, noise levels for prison outdoor PA systems can reach intermittent levels of approximately 70 to 80 dBA L_{max} at 50 feet. However, because the outdoor speaker system would be used on an infrequent basis and for only brief periods of time, increases in average hourly or average daily noise levels at nearby offsite residences are not anticipated to occur. However, given the increased proximity of proposed inmate housing to existing onsite employee housing, as well as existing and proposed offsite residential dwellings, intermittent increases in nighttime noise levels could result in an increased potential for sleep disruption. Predicted intermittent noise impacts to nearby onsite and offsite noise-sensitive land uses are discussed separately below.

Intermittent noise levels at nearby offsite residential dwellings located in San Quentin Village and at the planned residences in Larkspur are predicted to be approximately 41 dBA L_{max}, or less. As previously noted, ambient average daily noise levels at these residences are influenced primarily by vehicle traffic on area roadways and are estimated to range from the upper 40s to the lower 70s dBA CNEL, depending on distance from nearby major roadways. Because PA noise events would be intermittent (i.e., less than approximately one minute in duration), intermittent noise levels of approximately 41 dBA, or less, are

not anticipated to result in an increase in average hourly or average daily noise levels at nearby offsite residential dwellings.

In addition, although PA announcements may be audible for brief periods of time at nearby residences, particularly during the quieter evening and nighttime hours, predicted intermittent noise levels would not be anticipated to exceed noise standards typically recommended for the protection of human annoyance and sleep disruption. For instance, assuming a predicted maximum exterior intermittent noise level of 41 dBA at the nearest offsite residential dwellings and an average exterior-to-interior noise reduction of 15 dBA (with window open), predicted intermittent interior noise levels would be approximately 26 dBA L_{max}, or less, at the nearest offsite residential dwellings.

Additional intermittent noise events attributable to the proposed project include, the opening and closing of vehicle doors, adult voices, back-up power generators, and lawn maintenance equipment. However, because such noise events occur on an infrequent basis and would be similar to noise events and noise levels already occurring on the project site, noticeable increases in substantial noise levels (i.e., 5 dBA, or greater) at nearby noise-sensitive receptors would not be anticipated.

Because the outdoor speaker system would be used on an infrequent basis and for only brief periods of time, substantial increases in ambient noise levels at nearby offsite residences are not anticipated. However, given the proximity of proposed inmate housing to existing onsite employee housing (stacked but not single level, design option), increases in ambient noise levels at onsite noise-sensitive receptors could occur, resulting in increased potential of annoyance and sleep disruption. This would be a significant noise impact under the stacked design option, but less than significant under the single level design option (Impact 4.9-e).

Compatibility of Proposed Land Uses with Ambient Noise Levels

The State has established noise compatibility standards for prisons within Title 15 of the California Code of Regulations. The section states "Housing areas shall be designed and constructed so that the average noise level does not exceed 70 decibels during periods of activity and 45 decibels during sleeping hours."

Based on the noise monitoring conducted at the project site, average daytime noise levels currently range from the upper 40s to the lower 50s dBA. Implementation of the proposed project would not result in a substantial increase (i.e., 5 dBA or greater) in traffic noise levels along area roadways, nor would the proposed project result in the placement or operation of any major stationary sources of noise. Intermittent noise events associated with the proposed project, such as the use of PA systems, would occur on an infrequent basis and for only brief periods of time. Based on the ambient measurements obtained at the project site and assuming an average exterior-to-interior noise reduction of 15 dBA, predicted ambient interior noise levels are anticipated to be less than 40 dBA.

Predicted ambient interior noise levels would not exceed the State's recommended daytime or nighttime noise compatibility standards for prisons of 70 and 45 dBA L_{eq}, respectively. This impact would be less than significant (Impact 4.9-f).

4.9.4 PROPOSED MITIGATION MEASURES

LESS-THAN-SIGNIFICANT IMPACTS

The project was found to have a less-than-significant impact on the following issues and, therefore, no mitigation is needed:

4.9-d: Increases in Traffic Noise Levels
4.9-f: Compatibility of Proposed Land Uses with Ambient Noise Levels

SIGNIFICANT IMPACTS THAT CAN BE MITIGATED TO A LESS-THAN-SIGNIFICANT LEVEL

The following impacts were identified as *significant*. Mitigation is available to reduce this impact to a *less-than-significant* level and is recommended below (while not identified as a significant impact, this measure would also substantially reduce adverse noise levels to onsite residents):

4.9-a: Increases in Construction Noise

- The contractor will be required to keep construction equipment tuned and properly muffled.
- Noise-generating construction activities will be limited to between the hours of 7 a.m. and 6 p.m. Monday through Friday and between the hours of 9 a.m. and 5 p.m. on weekends and legal holidays.

4.9-b: Blasting Noise (Stacked Design Option only)

- If the stacked design option is selected, CDC will comply with mitigation measure 4.9-a, which limits construction activities to daytime hours, and a qualified blasting consultant shall be employed to ensure that the charge size, shot timing and cover material are sufficient to ensure that maximum peak linear noise levels do not exceed 129 dB, or a maximum noise level of 105 dBC at residences.

4.9-c: Construction Vibration Impacts (Stacked Design Option)

- For the stacked design option, advanced pile driving tests will be conducted and the pile driving specifications will be adjusted as needed to minimize potential damage to onsite residences. Blasting techniques will also be adjusted to limit potential damage. If construction activities produce vibration levels that damage state-owned houses at SQSP, CDC will examine any such damage and determine if repairs need to be made.

4.9-e: Increases in Stationary Source Noise (Stacked Design Option)

- A qualified blasting consultant shall be employed to ensure that charge size, shot timing and cover material are sufficient to ensure that ground vibration at nearby structures do not exceed 1 inch per second peak particle velocity.
- Exterior public address system speakers shall be directed away from nearby noise-sensitive receptors, to the extent feasible, to reduce noise levels at nearby residences.
- Lease agreements for employees residing onsite shall incorporate an advisory notice that residential dwellings may be located within an area subject to high noise levels, including those attributable to the intermittent use of exterior PA systems.